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The Altitudinal Distribution of the Ferns of the Appalachian
Mountain System.

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The following paper is a small portion of the results obtained in collecting and tabulating the altitudes observed and recorded for the plants of the East American Flora. The work was finished last winter, but was then, and is still, withheld from publication in order that more observations may be secured. It is too incomplete as yet to furnish any exact conclusions, and this part is here presented for the purpose of calling attention to this still almost entirely unknown department of Eastern North American Botany.

Careful and systematic altitudinal observations of plant stations have for a long time been recorded in England, and in the last few years the work has been prosecuted to some extent by Dr. C. Hart Merriam and his assistants in the pursuit of his biological survey for a portion of Arizona, especially in the vicinity of San Francisco Mountain. But in the eastern part of our continent, where the floral features are perhaps better known than anywhere else in North America, there is practically nothing on record concerning it. It is hoped that this preliminary contribution will excite an interest in the subject among our botanists and lead them to observe and record, as nearly correct as possible, the altitudes of the plants with which they may meet, especially in the Appalachian Mountain system and the contiguous territory.

A tentative attempt has been made to correlate the distribution of the following ferns with the faunal distribution as worked out by Dr. J. Allen (*Geographical Distribution of North American Mammals*, *Bull. Amer. Mus. Nat. Hist.* iv. 199-244 (1892)), and I have used the terms applied by him there to faunæ for floræ. In the main, the distribution of ferns appears to agree with that of mammals, but there seem to be some discrepancies which further observations may tend to reduce.

Dr. Allen has divided and subdivided the faunal areas of North America into *Realms*, *Regions*, *Subregions*, *Provinces*, *Subprovinces*, *Districts* and *Faunæ*. The latter only need concern us at present, and of his eleven faunæ four cover the territory under consideration. These are known as the CANADIAN, the ALLEGHANIAN, the CAROLINIAN, and the LOUISIANIAN, and their geographic limits in the following lines are taken from Dr. Allen's paper already mentioned; however, their western portions are not considered here.

1. The CANADIAN FLORA includes the northern half of New England, Northern Ontario, New Brunswick, Quebec, and the southwestern angle of Newfoundland. In addition to this more or less connected area, it is represented by detached tracts of greater or less extent along the summits of the Appalachian Mountain System as far south as Georgia.

2. The ALLEGHANIAN FLORA is bounded on the north by the *Canadian*, and on the south by the *Carolinian*. It runs southward as an irregular belt on the upper slopes of the mountains, separating the *Canadian* from the *Carolinian*.

3. The CAROLINIAN FLORA meets the *Alleghanian* on the north in Pennsylvania, New York and New Jersey, and doubles the mountain system where the latter runs out in Northern Alabama and Georgia. It passes into the plains on the west and on the east descends into the pene-plains, reaching the Atlantic Ocean from Virginia to New York, and separated from the water from Virginia southward by the *Louisianian*.

4. The LOUISIANIAN FLORA includes all the Southern States south of the *Carolinian* except the extreme end of South Florida.

Now, what I hope to be able to work out in the future is: 1.—how far the *Canadian flora* descends down the slopes from the summits of our highest mountain peaks; 2.—at what altitude the

Canadian meets the *Alleghanian flora* along the upper slopes, and how far the latter extends down the mountain sides; 3.—the altitude to which the *Carolinian* rises to meet the *Alleghanian*; 4.—the line where the *Louisianian* and the *Carolinian* come together. This can be done only by the collection and tabulation of an immense number of altitudinal observations on all the plants of Eastern North America, and I take occasion through this channel to ask my fellow botanists to note and record careful observations when in the field, and report to me at their convenience.

Of course, the areas, belts or lines, as the case may be, will be affected by local conditions, and are influenced in the same way by the latitude as well as the altitude, the latter being a more or less perfect exhibition of the former in a perpendicular manner. On account of the influence of latitude the lines which bound the different areas will, if we start at the north and go south, gradually converge towards the mountains and rise towards the summits as the latitude decreases. If the direction be from south to north the lines will descend from the highlands and diverge at angles or curves from the mountains, expanding into broad areas towards the north. The problem is, as already stated, to locate these lines.

With the assistance of data at hand and the geographic distribution, the ferns as given below have been placed each in its respective flora or floras, and by the aid of altitudes the direction of the lines can be seen in a general way.

POLYPODIUM POLYPODIOIDES (L.) A. S. Hitchcock. (*Polypodium incanum*, Swartz.). Ranges from sea-level, from Virginia Beach, Va. (Britton) to Florida and the Gulf coast to 4,000 feet on Blowing Rock Mt., N. C. (Small & Heller); occurs at 1,000 feet in Winston county, Ala. (Mohr); at 3,000 feet at Estatoah Falls, Ga. (Small); at 2,100 feet at Marion, Va. (Miss Vail). [*Southern Carolinian*; *Louisianian*.]

POLYPODIUM VULGARE L. Ranges from sea-level along the Atlantic coast, from Central New Jersey northward to 5,800 feet on Grandfather Mt., N. C. (Small & Heller); occurs at 1,000 feet in Winston county, Ala. (Mohr); at 3,000 feet in Rabun county, Ga. (Small); at 5,678 feet on White Top Mt., Va. (Small); at 2,700 feet in Garrett county, Md. (J. D. Smith); at

2,300 feet on the Pocono Mt., Pa. (Porter); at 2,100 feet near Onteora, N. Y. (Miss Vail); at 4,000 feet in Northern Vermont (Pringle). [*Carolinian*; *Alleghanian*; *Canadian*.]

CHEILANTHES ALABAMENSIS (Buckl.) Kunze. Occurs at 450 feet in Bibb county, Ala. (E. A. Smith); at 600 feet near Florence, Ala. (Mohr); at 1,000 feet in Lawrence county, Ala. (Mohr). [*Carolinian*.]

CHEILANTHES TOMENTOSA Link. Occurs at 600 feet near Florence, Ala. (Mohr); at 1,900 feet in Swain county, N. C. (Beardslee & Kofoid); at 1,000 feet at Toccoa Falls, Ga. (Small); at 1,500 feet on the highest ridge in Talladega county, Ala. (Mohr). [*Carolinian*.]

CHEILANTHES LANOSA (Michx.) Watt. (*Cheilanthes vestita*, Swartz.) Ranges from near sea level along the Atlantic coast from New York southward to 1,900 feet in Swain county, N. C. (Beardslee & Kofoid); occurs at 750 feet in Gwinnett county, Ga. (Small); 800 feet at in Cullman county, Ala. (Mohr); at 1,000 feet at Roanoke, Va. (Britton); at 1,500 feet at Harper's Ferry, Md. (J. D. Smith); at 250 feet in Lancaster county, Pa. (Porter). [*Alleghanian*; *Carolinian*.?]

PELLÆA ATROPURPUREA (L.) Link. Ranges from 150 feet at Tuckaohö, N. Y. (Mrs. Britton) to 2,200 feet in Smyth county, Va. (Small); occurs at 1,000 feet in Ala. (Mohr); at 2,000 feet on Mt. Willoughby and Mt. Horr, Vt. (Faxon). [*Alleghanian*.]

PELLÆA GRACILIS (Michx.) Hooker. Ranges from 2,000 feet in Sullivan county, Pa. (C. E. Smith) to 2,500 feet on Mt. Willoughby, Vt. (Faxon), descends to 100 feet in Northern Vermont (Pringle). [*Alleghanian*.]

PTERIS AQUILINA L. Ranges from sea level along the Atlantic coast to 5,000 feet on Grandfather Mt., N. C. (Small and Heller); occurs at 3,000 feet in Rabun county, Ga. (Small); at 3,500 feet on the Iron Mts., Va. (Mrs. Britton); at 2,700 feet in Garrett county, Md. (J. D. Smith); at 2,300 feet on the Pocono Plateau, Pa. (Porter); at 1,200 feet at Westmore, Vt. (Deane); at 1,200 feet at Jaffrey, N. H. (Deane). [*Canadian*, *Alleghanian*, *Carolinian*, *Louisianian*.]

ADINATUM CAPILLUS-VENERIS L. Ranges from sea level in Florida to 250 feet in Central Alabama (Mohr); occurs at 700 feet

at South Pittsburg, Tenn. (Middleton); at 1,3000 feet at Cumberland Falls, Ky. (J. D. Smith). [*Louisianian*; *Carolinian*.]

ADIANTUM PEDATUM L. Ranges from sea level, along the Atlantic coast from New Jersey northward, to 5,000 feet on White Top Mt., Va. (Small); occurs at 1,000 feet in Northern Alabama (Mohr); at 1,200 feet near Toccoa Falls, Ga. (Small); at 4,000 feet on Blowing Rock Mt., N. C. (Small and Heller); at 2,700 feet in Garrett county, Md. (J. D. Smith); at 2,000 feet near Onteora, N. Y. (Miss Vail); at 1,000 feet at Franconia, N. H. (Faxon); at 2,500 feet in Willoughby Mt., Vt. (Faxon). [*Carolinian*; *Alleghanian*.]

WOODWARDIA AREOLATA (L.) Moore. Ranges from sea level along the Atlantic coast to 3,000 feet in the Great Smoky Mts., N. C. (Beardslee & Kofoid); occurs at 800 feet near Cullman, Ala. (Mohr). [*Louisianian*; *Carolinian*; *Alleghanian*.]

WOODWARDIA VIRGINICA (L.) Smith. Ranges from sea level along the Atlantic and Gulf coasts to 1,300 feet in Huntingdon county, Pa. (Lowrie); occurs at 200 feet near Colchester, Vt. (Pringle); at 300 feet at Belchertown, Vt. (Jesup). [*Louisianian*; *Carolinian*; *Alleghanian*.]

ASPLENIUM ACROSTICHOIDES Swartz. Ranges from near sea level along the Atlantic coast, from New Jersey northward to 5,000 feet on White Top Mt., Va. (Mrs. Britton); occurs at 2,700 feet in Garrett county, Md. (J. D. Smith); at 2,000 feet at Onteora, N. Y. (Miss Vail); at 1,000 feet at Amherst, Vt. (Brainerd); at 1,500 feet at Willoughby, Vt. (Rusby). [*Alleghanian*.]

ASPLENIUM ANGUSTIFOLIUM Michx. At 200 feet in Vermont (Pringle); ascends to 1,000 feet at Danville, Vt. (Faxon); occurs at 3,700 feet on Blue Mt., N. Y. (Miss Knight); at 1,200 feet in Blair county, Pa. (Porter); at 1,000 feet in Winston county, Ala. (Mohr). [*Alleghanian*.]

ASPLENIUM BRADLEYI D. C. Eaton. At 1,600 feet on Lookout Mt., Ala. (Mohr); descends to 1,000 feet at Stone Mt., Ga. (Small); to 260 feet in Lancaster county, Pa. (Small). [*Alleghanian*.]

- ASPLENIUM EBENOIDES R. R. Scott. Ranges from sea level at Philadelphia, Pa. (Scott), to 1,400 feet at Mt. Crawford, Va. (Heller); occurs at 400 feet in Hale county, Ala. (Miss Tutwiler); at 300 feet near Easton, Pa. (Porter, Small); at 500 feet in Sussex county, N. J. (Rusby); at 700 feet near Canaan, Conn. (Adam). [*Alleghanian*.]
- ASPLENIUM FONTANUM (L.) Bernh. Occurs at about 600 feet above Williamsport, Pa. (McMinn).
- ASPLENIUM FILIX-FEMINA (L.) Bernh. Ranges from sea level along the Atlantic coast to 6,000 feet on Grandfather Mt., N. C. (Small & Heller); occurs at 800 feet in Cullman county, Ala. (E. A. Smith); at 5,000 feet on White Top Mt., Va. (Mrs. Britton); at 2,700 feet in Garrett county, Md. (J. D. Smith); at 2,000 feet at Onteora, N. Y. (Miss Vail); at 2,000 in Northern Vermont (Brainerd, Rusby). [*Louisianian*; *Carolinian*; *Alleghanian*; *Canadian*.]
- ASPLENIUM MONTANUM Willd. Ranges from Northern Pennsylvania to Georgia along the mountains, descends from 4,500 feet on Grandfather Mt., N. C. (Small & Heller) to 260 feet in Lancaster county, Pa. (Porter); at 1,600 feet on Lookout Mt., Ala. (Mohr); at 1,500 feet in Georgia (Small); at 2,700 feet in Garrett county, Md. (J. D. Smith); at 1,500 feet on Mt. Tammany, N. J. (Knipe). [*Alleghanian*.]
- ASPLENIUM PARVULUM Mart. & Gal. Ranges from near the Atlantic coast, from Florida to Virginia, to 2,400 feet in Smyth county, Va. (Small); occurs at 1,000 feet in Lawrence county, Ala. (Mohr); at 1,700 feet near Johnson City, Tenn. (Porter). [*Louisianian*; *Carolinian*.]
- ASPLENIUM PINNATIFIDUM Nutt. Ranges from sea level at Philadelphia, Pa. (Nuttall) to 4,300 feet on Grandfather Mt., N. C. (Small & Heller); occurs at 600? feet in Blount county, Ala. (J. D. Smith); at 1,500 feet at Stuart, Va. (Heller); at 1,500 feet at Harper's Ferry, Md. (J. D. Smith); at 300 feet in Eastern Pennsylvania (Porter). [*Alleghanian*.]
- ASPLENIUM PLATYNEURON (L.) Oakes. Ranges from sea level along the Atlantic coast to 4,200 feet on Blowing Rock Mt., N. C. (Small & Heller); occurs at 2,000 feet in Rabun county,

Ga. (Small); at 2,700 feet in Garrett county, Md., (J. D. Smith); at 2,000 feet in Monroe county, Pa. (Porter); at 500 feet in Vermont (Brainerd, Pringle). [*Alleghanian*; *Carolinian*.]

ASPLENIUM RUTA-MURARIA, L. Ranges from Vermont to New Jersey at about 300 feet; occurs at 1,600 feet on Lookout Mt., Ala. (Mohr); at 1,500 feet at Warm Springs, N. C. (J. D. Smith); at 2,100 feet at Marion, Va. (Judge Brown); at 250 feet in Northampton county, Pa. (Porter); at 2,200 feet on Mt. Willoughby, Vt. (Faxon). [*Alleghanian*.]

ASPLENIUM TRICHOMANES, L. Ranges from near sea level from New Jersey northward to 2,500 feet on Mt. Mansfield and Mt. Horr, Vt. (Faxon); occurs at 2,000 feet on the Pocono Mt., Pa. (Porter); at 2,100 feet in Smyth county, Va. (Small); at 1,000 feet near Gadden, Ala. (Mohr). [*Alleghanian*.]

ASPLENIUM VIRIDE, Hudson. At 4,000 feet on Mt. Mansfield, Vt. (Pringle) descends to 2,000 feet in Smuggler's Notch, Vt. (Faxon). [*Canadian*; *Alleghanian*?.]

SCOLOPENDRIUM SCOLOPENDRIUM (L.) Karst. (*Scolopendrium vulgare*, Smith.) Ranges from about 800 feet in Onondago county, N. Y. (Pursh and others) to 700 feet near South Pittsburg, Tenn. (Cheatham). [*Alleghanian*; *Carolinian*.]

CAMPTOSORUS RHIZOPHYLLUS (L.) Link. Ranges from sea level in New Jersey and New York to 3,000 feet near Blowing Rock, N. C. (Small and Heller); occurs at 2,500 feet in Smith county, Va. (Small); at 100-500 feet in Northern Vermont (Faxon, Brainerd). [*Carolinian*; *Alleghanian*.]

PHEGopteris DRYopteris (L.) Fee. Ranges from 500? feet in Western New Jersey to 2,000 feet at Onteora, N. Y. (Miss Vail); occurs at 1,000 feet in Hampshire county, W. Va. (J. D. Smith); at 1,100 feet in Luzerne county, Pa. (Heller); at 1,300 feet at Westmore, Vt. (Deane); at 2,000 feet at Randolph, N. H. (Churchill). [*Alleghanian*.]

PHEGopteris HEXAGONOPTERA (L.) Fee. Ranges from near sea-level along the Northern Atlantic coast to 4,000 feet on Roan Mt., N. C. (Britton); occurs at 600 feet at Florence, Ala.

(Mohr); at 2,400 feet near Marion, Va. (Mrs. Britton); at 2,700 feet in Garrett county, Md. (J. D. Smith); at 500 feet in Northern Vermont (Brainerd). [*Louisianian*; *Carolinian*; *Alleghanian*.]

PHEGopteris PHEGopteris (L.) Underw. (*Phegopteris polypodioides* Fee.) Ranges from 600 feet at Newton, N. J. (Miss Thompson) to 4,000 feet in Northern Vermont (Pringle); occurs at 2,000 feet in Monroe county, Pa. (Mrs. Britton); at 2,200 feet at Onteora, N. Y. (Miss Vail); at 2,500 on Willoughby Mt., Vt. (Rusby). [*Alleghanian*; *Canadian*.]

DRYopteris BOOTHII (Tuckerm.) Underw. Ranges from sea level from New Jersey to Massachusetts, to 2,000 in Northern Vermont (Brainerd). [*Alleghanian*.]

DRYopteris CRISTATA (L.) A. Gray. Ranges from near sea level, from New Jersey northward, to 2,700 feet in Garrett county, Md. (J. D. Smith); occurs at 2,000 feet on the Pocono Mt., Pa. (Porter); at 1,200 feet at Jaffrey, N. H. (Deane); at 1,300 feet at Westmore, Vt. (Deane). [*Carolinian*; *Alleghanian*.]

DRYopteris CRISTATA, var. **CLINTONIANA** (D. C. Eaton) Underw. Ranges sea level from New Jersey northward to 1,300 feet at Westmore, Vt. (Deane). [*Carolinian*; *Alleghanian*.]

DRYopteris FRAGRANS (L.) Schott. At 2,000–4,000 feet on Mt. Mansfield, Vt. (Faxon); descends to 750 feet near Shelburne, N. H. (Deane); to 400 feet on cliffs, Vt. (Pringle). [*Canadian*; *Alleghanian*.]

DRYopteris GOLDIEANA (Hook.) A. Gray. Ranges from near sea level northward, (100 feet, Vt. (Pringle)), to 5,000 feet on White Top Mt., Va. (Britton); occurs at 3,500 feet in Swain county, N. C. (Beardslee and Kofoid); at 2,700 feet in Garrett county, Md. (J. D. Smith); at 1,200 feet in Blair county, Pa. (Porter); at 2,500 feet on Willoughby Mt., Vt. (Faxon). [*Alleghanian*; *Canadian*.]

DRYopteris MARGINALIS (L.) A. Gray. Ranges from sea level along the Atlantic coast from New Jersey northward to 5,000 feet on White Top Mt., Va. (Small); occurs at 1,800 feet on Lookout Mt., Ala. (Mohr); at 4,200 feet on Blowing Rock Mt.,

N. C. (Small and Heller); at 2,700 in Garrett county, Md. (J. D. Smith); at 2,000 feet at Onteora, N. Y. (Miss Vail); at 1,000 feet in Northern Vermont (Brainerd). [*Louisianian*; *Carolinian*; *Alleghanian*; *Canadian*.]

DRYOPTERIS NOVEBORACENSIS (L.) A. Gray. Ranges from sea level along the Atlantic coast, from N. C., northward, to 5,000 feet on White Top Mt., Va. (Mrs. Britton); occurs at 650–900 feet in Northern Alabama (Mohr); at 2,200 feet, near Marion, Va. (Mrs. Britton); at 2,700 feet in Garrett county, Md. (J. D. Smith); at 2,000 feet on the Pocono Mt., Pa. (Porter); at 2,200 ft., Onteora, N. Y. (Miss Vail); at 1,500 feet in Northern Vermont (Brainerd). [*Alleghanian*; *Canadian*?]

DRYOPTERIS SPINULOSA (Retz.) Kuntze. Ranges from near sea level in New York and New Jersey to 2,600–5,000 feet on White Top Mt., Va. (Mrs. Britton); occurs at 2,700 feet in Garrett county, Md. (J. D. Smith); at 2,200 on the Pocono Mt., Pa. (Porter); at 2,000 feet at Onteora, N. Y. (Miss Vail); at 500 feet in Northern Vermont (Brainerd); at 5,000 feet on Mt. Adams, N. H. (Deane). [*Alleghanian*; *Canadian*.]

DRYOPTERIS SPINULOSA, var. DILITATA (Hoffm.) Underw. Ranges from 500 feet in Northern New Jersey, northward to 6660 feet on Clingman's Dome, N. C. (Beardslee and Kofoid); occurs at 6,000 feet on Grandfather Mt., N. C. (Small and Heller); at 5678 feet on White Top Mt., Va. (Miss Leeming); at 2,300 feet on the Pocono Mt., Pa. (Porter); at 2,600 feet at Avalanche Pass, N. Y., (Britton); at 4,500 feet on the mountains of New England (Deane, Faxon, Brainerd, Pringle). [*Alleghanian*; *Canadian*.]

DRYOPTERIS SPINULOSA, var. INTERMEDIA (Muhl.) Underw. Ranges from near sea level from New Jersey northward to 5,000 feet on White Top Mt., Va. (Mrs. Britton); occurs at 2,000 feet on the Pocono Mt., Pa. (Porter); at 2,000 feet at Onteora, N. Y. (Miss Vail); at 5,000 feet on the mountains of New England (Faxon, Brainerd, Pringle, Deane). [*Alleghanian*; *Canadian*.]

DRYOPTERIS THELYPTERIS (L.) A. Gray. Ranges from sea level along the Atlantic coast to 2,000 feet in Northern Vermont (Brainerd); occurs at 300 feet in Baltimore county, Md. (J. D.

Smith); at 700 feet at Shelburne, N. H. (Deane). [*Louisianian*; *Carolinian*; *Alleghanian*.]

POLYSTICHUM ACROSTICHOIDES (Michx.) Schott. Ranges from near sea level along the Atlantic coast to 2,700 feet in Garrett county, Md. (J. D. Smith); occurs at 2,000 feet in Rabun county, Ga. (Small); at 2,400 feet near Marion, Va. (Judge Brown); at 2,000 feet at Onteora, N. Y. (Miss Vail); at 2,000 feet in Northern Vermont (Pringle, Deane). [*Louisianian*; *Carolinian*; *Alleghanian*.]

POLYSTICHUM ACROSTICHOIDES, var. *SCHWEINITZII* (Beck.). Near sea level in New Jersey; ascends to 1,500 feet in Habersham county, Ga. (Small); to 2,000 feet on the Pocono Mt., Pa. (Mrs. Britton); to 2,500 feet at Onteora, N. Y. (Miss Vail). [*Alleghanian*.]

POLYSTICHUM BRAUNII (Spenner). (*Aspidium Braunii*, Spenner.) Ranges from 2,000 feet on North Mountain, Sullivan county, Pa., to 5,000 feet at Randolph, Vt. (Churchill); descends to 1,000 feet at Ferrisburg and Williamstown, Vt. (Faxon, Pringle). [*Alleghanian*; *Canadian*.]

CYSTOPTERIS BULBIFERA (L.) Bernh. Ranges from near sea level northward to 3,500 feet at Mountain Lake, Va. (Britton); occurs at 1,000 feet in Winston county, Ala. (Mohr); at 1,300 feet on Willoughby Mt., Vt. (Deane). [*Carolinian*; *Alleghanian*.]

CYSTOPTERIS FRAGILIS (L.) Bernh. Ranges from near sea level along the Atlantic and Gulf coasts to 5,000 feet on Mt. Washington, N. H. (Faxon); occurs at 1,000 feet in Winston county, Ala. (Mohr); at 3,000 feet on Pond Mt., Va. (Miss Cathcart); at 2,700 feet in Garrett county, Md. (J. D. Smith); at 2,700 feet at Avalanche Pass, N. Y. (Britton); at 3,000 feet in Northern Vermont (Pringle, Faxon). [*Louisianian*; *Carolinian*; *Alleghanian*; *Canadian*.]

CYSTOPTERIS FRAGILIS, var. *DENTATA*, Hook. Ranges from 300 feet in Lancaster county, Pa. (Porter), to 5,500 feet on Roan Mt., N. C. (J. D. Smith). [*Alleghanian*; *Canadian*?]

ONOCLEA SENSIBILIS L. Ranges from sea level along the Atlantic and Gulf coasts to 3,200 feet in Preston county, W. Va. (J. D.

Smith); occurs at 2,100 feet in Smith county, Va. (Mrs. Livermore); at 2,000 feet at Onteora, N. Y. (Miss Vail); at 1,200 feet at Jaffrey, N. H. (Deane); at 1,000 feet in Northern Vermont (Brainerd, Pringle.) [*Louisianian*; *Carolinian*; *Alleghanian*.]

ONOCLEA STRUTHIOPTERIS (L.) Hoffm. Ranges from near sea level along the northern Atlantic coast, (New Jersey and northward), to 2,000 feet at Willoughby, Vt. (Rusby); ascends to 1,200 feet in Bald Eagle Valley, Pa. (Porter). [*Alleghanian*.]

Woodsia alpina (Bolton.) S. F. Gray (WOODSIA HYPOBOREA R. Br.). At 2,000–4,200 feet on Mt. Mansfield, Vt. (Faxon, Pringle); descends to 2,000 feet on Mt. Willoughby, Vt. (Faxon, Pringle). [*Canadian*.]

WOODSIA GLABELLA R. Br. At 4,000 feet on Mt. Mansfield, Vt. (Faxon); descends to 1,500 feet on the same mountain (Pringle); to 1,000–2,500 feet at Willoughby, Vt. (Faxon); to 900 feet at Gorham, N. H. (Deane). [*Canadian*; *Alleghanian*?.]

WOODSIA ILVENSIS (L.) R. Br. Ranges from near sea level from Northern New Jersey northward to 5,000 feet on Mt. Lincoln, N. H. (Faxon); occurs at 5,000 feet at Randolph, N. H. (Churchill); at 3,000 feet on Mt. Mansfield, N. H. (Faxon); at 2,000 feet at Crawford Notch, N. H. (Faxon); at 900 feet at Gorham, N. H. (Deane); at 1,800 feet at Plattekill Clove, N. Y. (Miss Vail); at 700 feet in Lycoming county, Pa. (Small & Heller); at 250 feet in Bucks county, Pa. (Porter). [*Alleghanian*; *Canadian*.]

WOODSIA OBTUSA (Spreng.) Torr. Ranges from near sea level in Northern New Jersey and northward to 2,200 feet at Broad Ford, Va. (Mrs. Britton); occurs at 1,000 feet in Winston county, Ala. (Mohr); at 1,500 feet in Alleghany county, Md. (J. D. Smith); at 1,000 feet in Northern Vermont (Brainerd). [*Alleghanian*.]

DICKSONIA PUNCTILOBULA (Michx.) A. Gray. Ranges from near sea level along the Atlantic coast from New Jersey northward to 5,678 feet on White Top Mt., Va. (Small); occurs at 1,200 feet in Winston county, Ala. (Mohr); at 4,500 feet on Blowing Rock Mt., N. C. (Small & Heller); at 2,700 feet in Garrett

county, Md. (J. D. Smith); at 2,000 feet on the Pocono Mt., Pa. (Porter); at 2,000 feet at Onteora, N. Y. (Miss Vail); at 2,000 feet in Northern Vermont (Brainerd). [*Carolinian*; *Alleghanian*; *Canadian*.]

TRICHOMANES PETERSI A. Gray. At 1,000 feet along Black Creek, Etowah county, Ala. (Mohr), and from 1,000–1,200 feet along the Sipsey River, Ala. (Peters). [*Carolinian*.]

TRICHOMANES RADICANS Swartz. At 600 feet in Marion county, Ala. (Mohr); at 1,000 feet in Hale county, Ala. (E. A. Smith); at 1,000 feet in Winston county, Ala. (Mohr). [*Louisianian*; *Carolinian*.?]

LYGODIUM PALMATUM (Bernh.) Swartz. Ranges from near sea level in Massachusetts and New Jersey to 2,100 on the Pocono Plateau, Pa. (Porter). [*Alleghanian*.]

OSMUNDA CINNAMOMEA L. Ranges from sea level along the Atlantic coast to 5,678 feet on White Top Mt., Va. (Mrs. Britton); occurs at 3,000 feet in Rabun county, Ga. (Small); at 2,700 feet in Garrett county, Md. (J. D. Smith); at 2,000 feet on the Pocono Mt., Pa. (Porter); at 2,000 feet in Greene county, N. Y. (Miss Vail); from 90–1,000 feet in Northern Vermont (Pringle, Brainerd). [*Louisianian*; *Carolinian*; *Alleghanian*; *Canadian*.]

OSMUNDA CINNAMOMEA, forma FRONDOSA (A. Gray). Britton. Ranges from sea level in New Jersey and New York to 3,000 feet on Pine Mt., Grayson county, Va. (Small). [*Carolinian*; *Alleghanian*.]

OSMUNDA CLAYTONIANA L. Ranges from sea level along the Northern Atlantic coast (New Jersey to Maine) to 5,000 feet on White Top Mt., Va. (Mrs. Britton); occurs at 2,700 feet in Garrett county, Md. (J. D. Smith); at 2,000 feet on the Pocono Mt., Pa. (Porter); at 2,200 feet near Onteora, N. Y. (Miss Vail); from 90–1,000 feet in Northern Vermont (Brainerd, Pringle), and from 700–1,000 feet in Coos county, N. H. (Deane). [*Alleghanian*.]

OSMUNDA REGALIS L. Ranges from sea level along the Atlantic coast to 3,000 feet on Brushy Mt., Va. (Small); occurs at 2,700

feet in Garrett county, Md. (J. D. Smith); at 2,000 feet on the Pocono Mt., Pa. (Porter); at 2,000 feet at Onteora, N. Y. (Miss Vail); from 90–1,000 feet in Northern Vermont (Pringle, Brainerd); at 1,000 feet in Coos county, N. H. (Deane). [*Louisianian*; *Carolinian*; *Alleghanian*.]

Notes upon various Species of Iridaceæ and other Orders.

BY THOMAS MORONG.

IRIDACEÆ.

Two species of *Iris* must be added to the list of those within the range of A. Gray's Manual, Ed. 6, and one other if Canada be included.

Iris Germanica, L., the great violet-colored flag of Middle Europe, was found by Mr. A. A. Heller during the last year apparently well established near Mt. Crawford, Western Virginia. Probably a garden escape.

Iris Missouriensis, Nutt. (*I. Tolmieana*, Herb.) occurs in Missouri and Nebraska, and more commonly towards the southwest.

Iris Hookeri, Penny, Steud. Nom. Bot. Pt. 1, 822 (1840). This has been established as a good species by Mr. Watson (Coulter. Bot. Gaz. xii. 100). It occurs in Newfoundland and along the lower St. Lawrence (Pringle). *I. Canadensis*, which one might at first thought imagine it to be, has not yet been identified. This, as nearly as we can judge, is merely a form of *I. versicolor*, L., but may prove distinct when we come to understand the Canadian species more thoroughly.

Iris tridentata, Pursh, not hitherto detected in our territory, is most commonly called *I. tripetala*, Walter, but Walter's name is antedated by *I. tripetala*, L. f. Supp. 97 (1781), a different species, now transferred to *Moræa*, but remaining a synonym nevertheless.

SISYRINCHIUM.

The species of the Atlantic States should be termed *S. Bermudianum*, L., in spite of the fact that it is not known to occur in Bermuda, as this was undoubtedly the original name given to it